

REMARKS

Claims 1-28 are pending in the case. The Examiner rejected claims 1-8, 10, 14-18, 21, 23, 25, and 27-28 under 35 U.S.C. §102(b) as anticipated by Japanese Patent No. 11-175919 (hereinafter “JP ‘919”). The Examiner rejected claims 9, 11-13, 22, 24 and 26 under 35 U.S.C. §103(a) as being unpatentable over JP ‘919 in view of U.S. Patent No. 6,493,196 to Noma et al. (hereinafter “Noma”). The Examiner rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable in view of JP ‘919 and U.S. Patent No. 6,515, 838 to Gill (hereinafter “Gill”). The Examiner objected to claims 19 and 20, but notes that these claims would be allowable if rewritten in independent form. The claims are believed to be in condition for allowance, and applicant respectfully requests the prompt allowance of claims 1-28.

REJECTION OF CLAIMS 1-8, 10, 14-18, 21, 23, 25, AND 27-28 UNDER 35 U.S.C. §102(b)

The Examiner rejected claims 1-8, 10, 14-18, 21, 23, 25, and 27-28 under 35 USC §102(b) in view of JP ‘919. This rejection is respectfully traversed.

It is well settled that under 35 U.S.C. §102 “an invention is anticipated if . . . all the claim limitations [are] shown in a single art prior art reference. Every element of the claimed invention must be literally present, arranged as in the claim. The identical invention must be shown in as complete detail as is contained in the patent claim.” *Richardson v. Suzuki Motor Co., Ltd.*, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

In determining whether a prior art reference anticipates a claim, it is necessary to (1) determine the scope of Applicant's broadest claim, (2) determine exactly what the single prior art reference discloses, and (3) compare each and every claim limitation against the prior art disclosure. *SSIH Equipment, S.A. v. U.S Int'l Trade Commission et al.*, 218 U.S.P.Q. 678, 688. Only if each limitation is literally disclosed by the prior art reference is the claim anticipated.

Claim 1 recites, in pertinent part, “pinning layers disposed to one side of the reference layer, the pinning layers comprising at least two antiferromagnetic (AFM) Ni-Mn films.” Applicant respectfully asserts that JP ‘919 fails to teach or disclose “pinning layers comprising at least two antiferromagnetic (AFM) Ni-Mn films.” In addition, claim 14 recites, in pertinent part, “pinning layers disposed to one side of the reference layer, the pinning layers comprising at least

two antiferromagnetic (AFM) Pt-Mn films.” Claims 27 and 28 each recite, in pertinent part, “the pinning layers comprising at least two antiferromagnetic (AFM) films selected from the same Mn-based alloy system. Consequently, the independent claims 1, 14, 27, and 28 claim pinning layers comprised of at least two AFM films each selected from the same Mn-based alloy system, in particular, a two element alloy system such as Ni-Mn and Pt-Mn.

In contrast, JP ‘919 discloses “The Mn alloy of the first anti-ferromagnetic layer includes more than one kind[s] of elements selected from the group of Pt, Ni, Rh, Ru, Au, and Pd. The Mn alloy of the second anti-ferromagnetic layer includes more than on[e] kind of elements selected from the group of Pt, Ni, Ir, Rh, Ru, Co, Fe and Pd.” JP ‘919 specifically discloses two different alloy systems ((Pt, Ni, Rh, Ru, Pd, and Au) and (Pt, Ni, Rh, Ru, Pd, Ir, Co, and Fe)). While elements Pt, Ni, Rh, Ru, Pd are common, element Au and elements Ir, Co, and Fe are specifically not included in the other alloy system. In addition, according to JP ‘919, neither AFM layer may come from a two element alloy system. JP ‘919 specifically states that first AFM layer and second AFM layer include Mn and more than *one* kind of element selected from the respective groups.

Applicant respectfully disagrees with the Examiner’s assertion JP ‘919 discloses each element of independent claims 1, 14, 27, and 28. Specifically, the Examiner asserts that “the AFM film consists of two films which are both made of alloys of Mn (including Ni an Pt).” *See* Office action page 2.

As indicated above, JP ‘919 discloses that the first and second AFM layers are made of two different Mn alloy systems. Specifically, the element Au is listed only in an Mn alloy system for the first layer and elements Ir, Co, and Fe are listed only in the Mn alloy system for the second layer. While the common elements between the two alloy systems of JP ‘919 allow for the first and second AFM layers to originate from the same alloy system of at least three elements, for example Mn-Pt-Rh, JP ‘919 does not specifically require that the alloy systems for the first and second layers *be* the same as recited in the claims. This is “exactly what the single prior art reference discloses.” If JP ‘919 did require that the first and second layers come from the same Mn alloy system, JP ‘919 would not have included different elements Au, Ir, Co, and Fe in the element group listings.

If the alloy system for the first and second layer are not the same, the lattice of organized atoms of the first layer is not matched to the lattice of organized atoms of the second layer. Mismatched lattices between the first AFM layer and second AFM layer degrades the interface between the AFM layer comprising both the first AFM layer and second AFM layer and a ferromagnetic layer in contact with the first AFM layer. The degraded interface results in a poor exchange coupling and degraded pinning fields within the spin-valve sensor.

Furthermore, JP '919 requires that the Mn alloy systems used for the first layer and second layer include at least three elements. In contrast, independent claims 1 and 14 specifically recite a two element Mn alloy system (Mn-Ni, Mn-Pt). Both the JP '919 and the claimed invention relate to technology for spin-valve sensors. This technology involves materials in which the composition is measured and determined very precisely at an atomic level. An additional element in an alloy typically has dramatic effects. The quantity and structure of the elements in the alloys used is precisely controlled and organized such that the desired electromagnetic effects are achieved. Desirable characteristics such as a high blocking temperature, maximum corrosion resistance, optimal exchange coupling (described in detail in the specification at page 3, lines 17-23, page 4, lines 5-16, and page 3, lines 8-16). Are adversely affected by adding one or more elements to a two element Mn alloy system. In certain cases, a three element Mn alloy may not even be operable as a spin-valve sensor.

Accordingly, Applicant respectfully asserts that JP '919 fails to teach or disclose pinning layers comprised of at least two AFM films each selected from the same Mn-based alloy system, in particular, a two element alloy system such as Ni-Mn and Pt-Mn as claimed. Applicant respectfully submits that independent claims 1, 14, 27, and 28 are patentably distinct from the cited reference. In addition, claims 7-8, 10, 15-18, 21, 23, and 25 depend directly or indirectly from claims 1, 14, 27, and 28. Accordingly, Applicant also respectfully submits that these dependent claims are likewise patentably distinct for at least the same reasons.

REJECTION OF CLAIMS 9, 11-13, 22, 24, 26 and 28 UNDER 35 U.S.C. §103(a)

The Examiner rejected claims 9, 11-13, 22, 24 and 26 in view of 'JP '919 and Noma. The Examiner also rejected claim 28 in view of 'JP '919 and Gill. These rejections are

respectfully traversed.

The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. See MPEP § 2142. To establish a *prima facie* case of obviousness, the combination of the prior art references must teach or suggest all the claim limitations. MPEP § 2142.

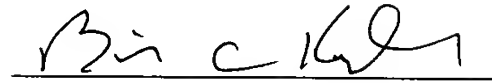
Applicant asserts that the combination of JP '919 and Noma fail to teach or suggest all the claim limitations of the independent claims 1, 14, 27, and 28. Specifically, JP '919 fails to teach or disclose pinning layers comprised of at least two AFM films each selected from the same Mn-based alloy system, in particular, a two element alloy system such as Ni-Mn and Pt-Mn. Applicant respectfully asserts that two AFM films from the same Mn-based alloy system in the claimed invention is fundamentally different from the two AFM films from different Mn-based alloy systems disclosed in JP '919.

Furthermore, JP '919 requires use of a Mn alloy system having three or more elements. In contrast, the claimed invention specifically claims specific two-element Mn alloy systems. Consequently, the JP '919 reference teaches contrary to a two-element Mn alloy system as recited in the claimed invention. These differences result in dramatic differences in the electromagnetic properties of a spin-valve sensor, as described above.

Claims 9, 11-13, 22, 24, and 26 depend directly or indirectly from the independent claims 1 and 14. Accordingly, Applicant respectfully asserts that these claims are also allowable because the claim limitation missing in claims 1 and 14 is also missing in these dependent claims. Consequently, Applicant respectfully asserts that JP '919 combined with Noma and Gill fail to teach or disclose all of the elements of claim 1, specifically, two AFM films from the same two-element Mn-based alloy system.

In view of the foregoing, Applicant submits that the application is in condition for immediate allowance. In the event any questions or issues remain that can be resolved with a phone call, the Examiner is respectfully requested to initiate a telephone conference with the undersigned.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brian C. Kunzler", is written over a horizontal line.

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